

LISBOA 2010
MAY 25/28
16th World Meeting

Towards Road Sustainability

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www.irf2010.com

- 1 Footprint**
- 2 Limits to growth**
- 3 Major problems**
- 4 Tools**
- 5 Final comments**

The sustainability problems start
all here:
... the ecological footprint !



Ecological footprint

A measure of human demand on the Earth's ecosystems. It represents the amount of biologically productive land and sea area needed to regenerate the resources a human population consumes and to absorb and render harmless the corresponding waste.

Average footprint of an European Citizen:

3 ha/inhabitant

Average footprint of a north-American citizen:

5 ha/inhabitant

Available in our world:

1,5 ha/inhabitant !

If we all had an **European** lifestyle:

2 Planets!



If we all had a **north-American** lifestyle:

3 Planets!

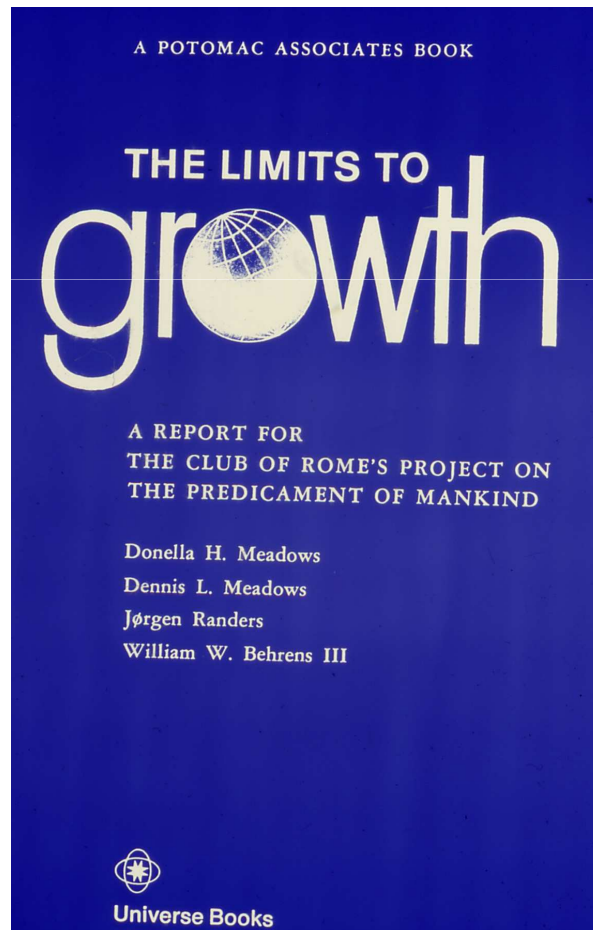




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2 Limits to growth

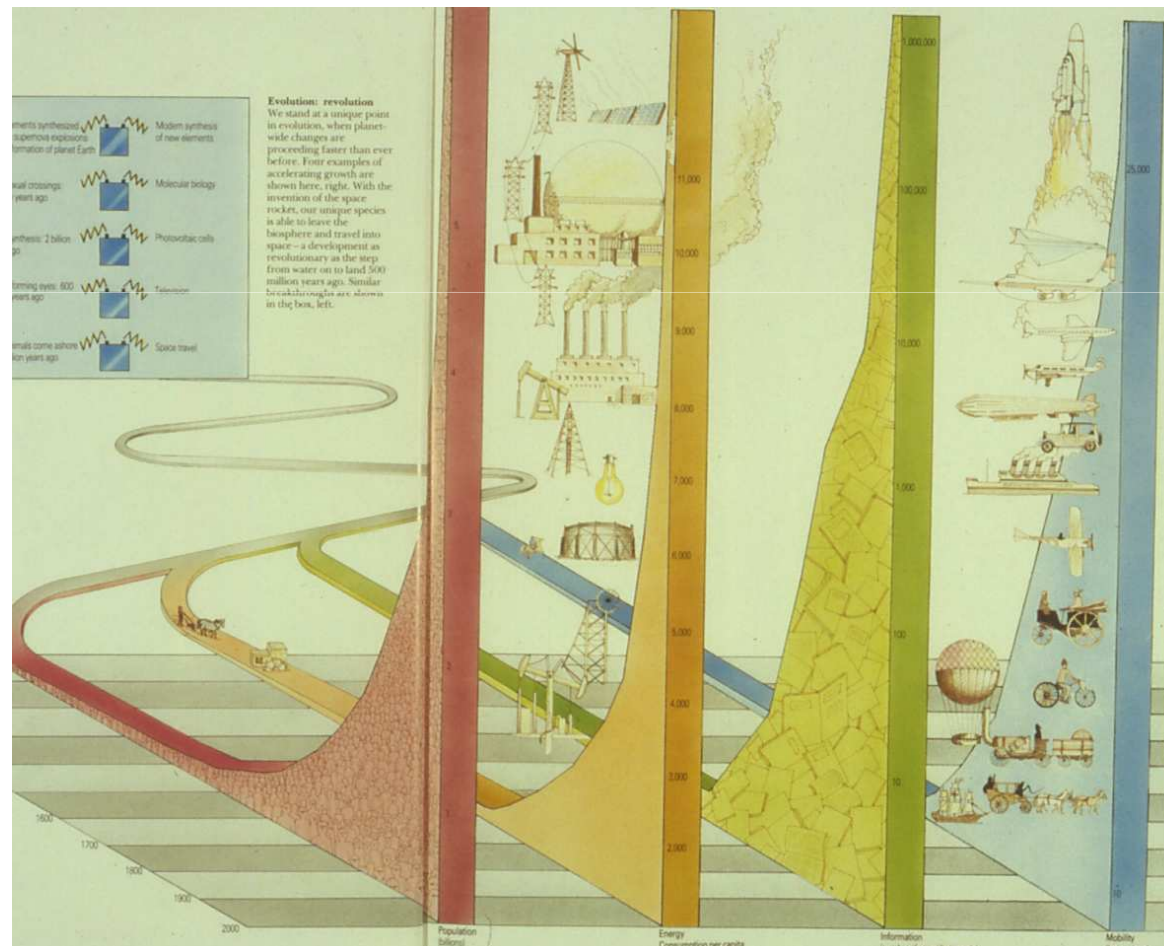
Are there any limits to our growth?



**This question
was first asked
in 1972**

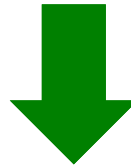
**The answer
seems to be
YES!**

Exponential growth is a mathematical concept... ... not a physically feasible one!

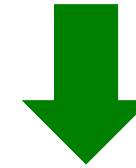




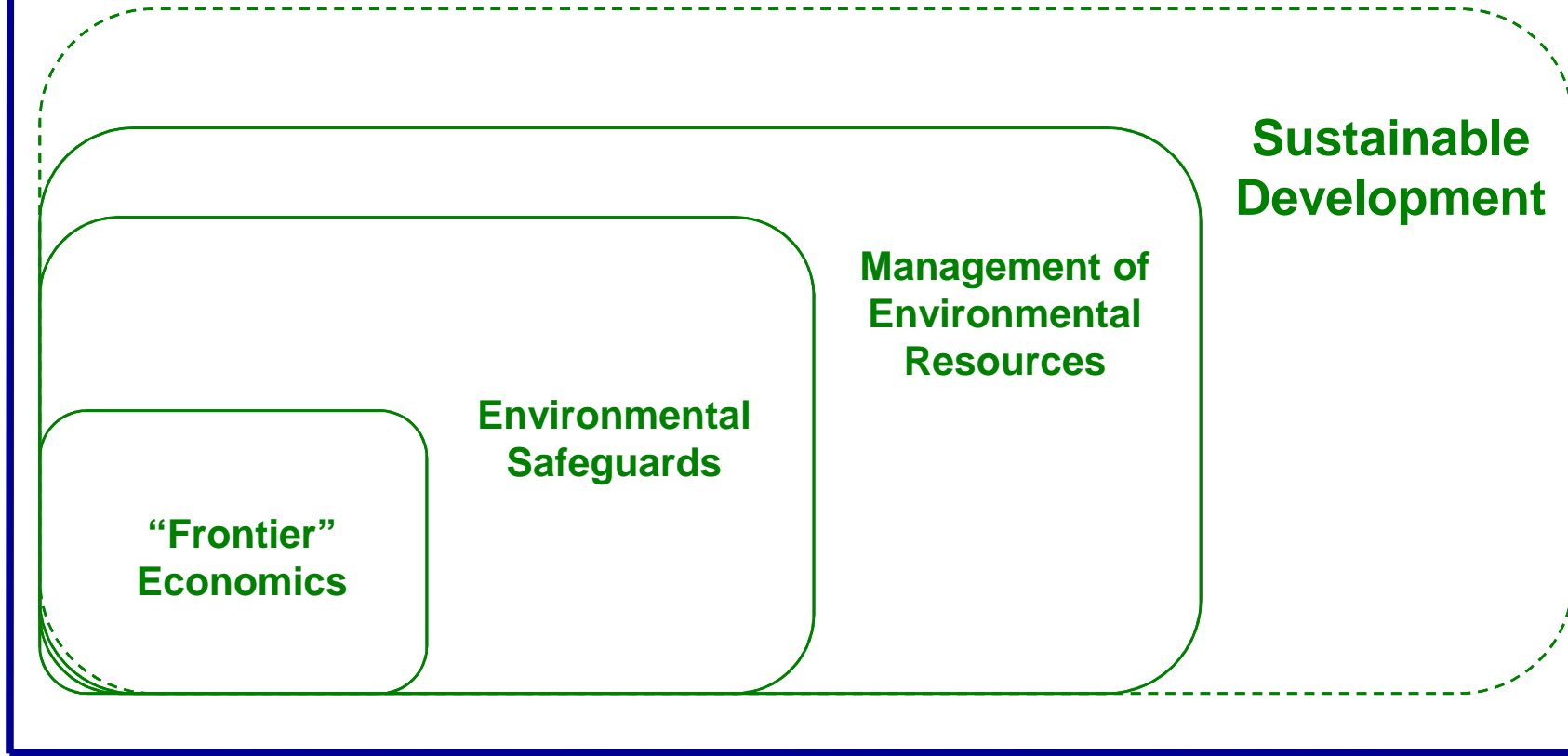
1972
UN Stockholm
Conference



1992
UN Rio's
Conference



Scope of environment concerns



60's

70's

80's

90's

Y2K



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3 Major problems

Major Global Environmental Problems:

Climate Change

Loss of Biodiversity

**Roads and transport
are very relevant for both !**

Climate Change

- **Transport is responsible for 23% of GHG emissions**
- **75% of it comes from road vehicles**
- **95 % of transport energy comes from petroleum**
- **1 ton of cement used in construction generates 1 ton of CO2**

Loss of Biodiversity

- **Habitat loss**
- **Fragmentation of ecosystems**
- **Landscape downgrading**

... and other impacts

- **Significant use of construction materials**
- **Soil sealing**
- **Air and water pollution, noise, etc.**

Two dimensions of the environmental problems:

The infrastructure

Construction / Maintenance / Decommissioning

The operation

Traffic / Integration in a transport system

Both have significant impacts that require attention



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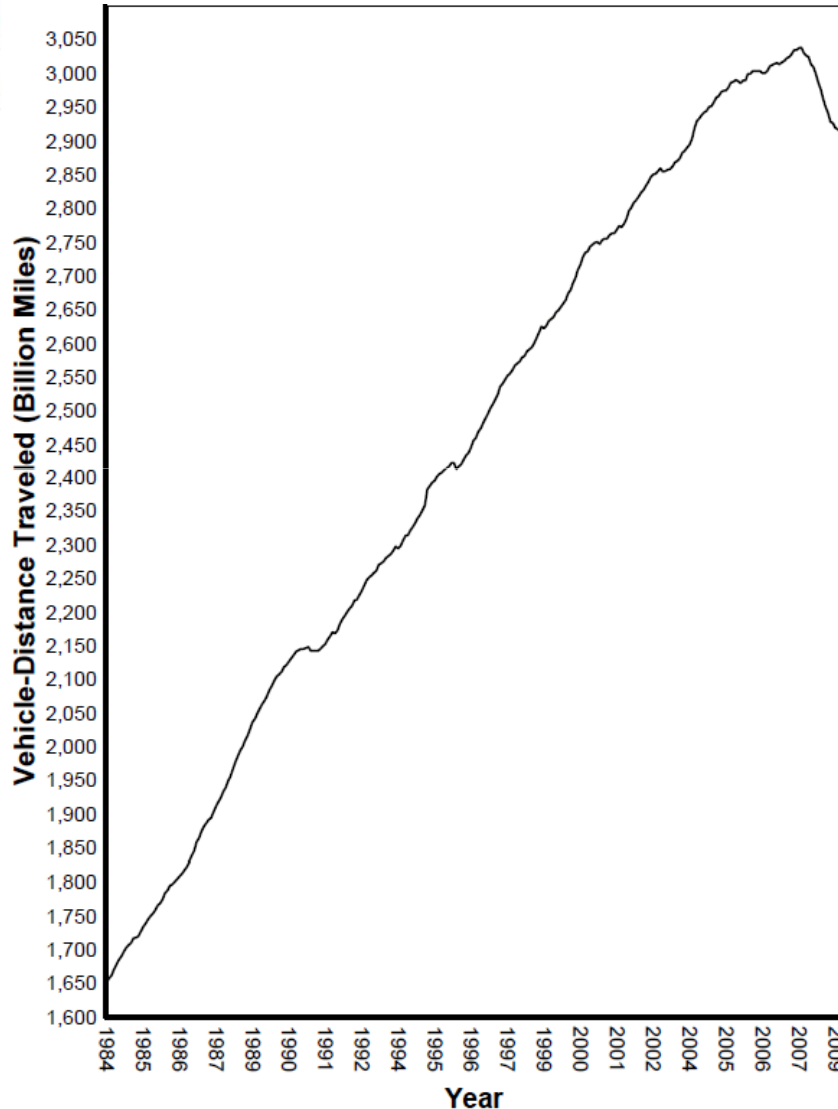


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US vehicle miles travelled

1984: 1 650 billion miles

2009: 3 050 billion miles

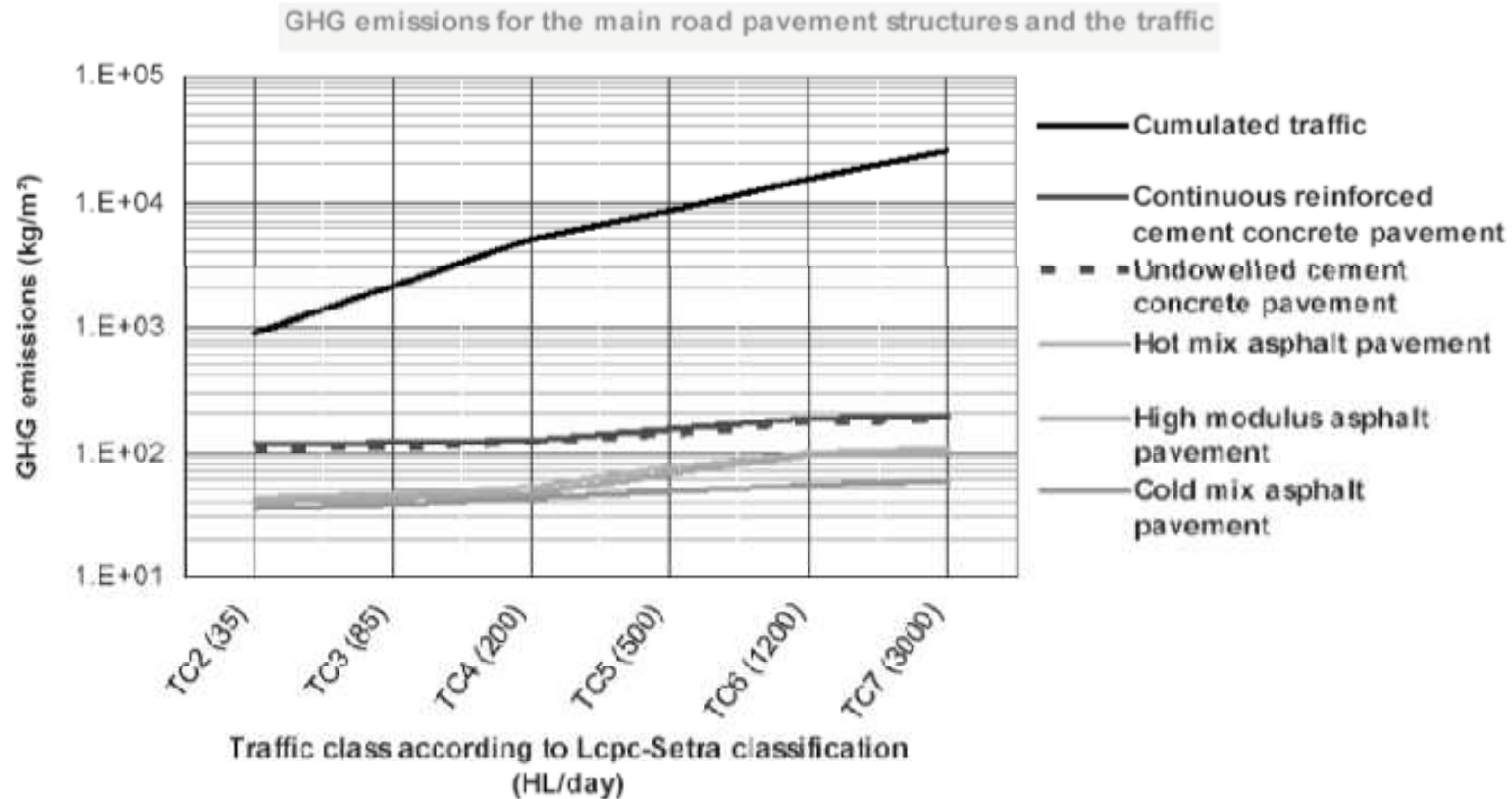
An increase of 184% !

(Source: US Federal Highway Administration 2009)

Construction Phase vs. Operation Phase

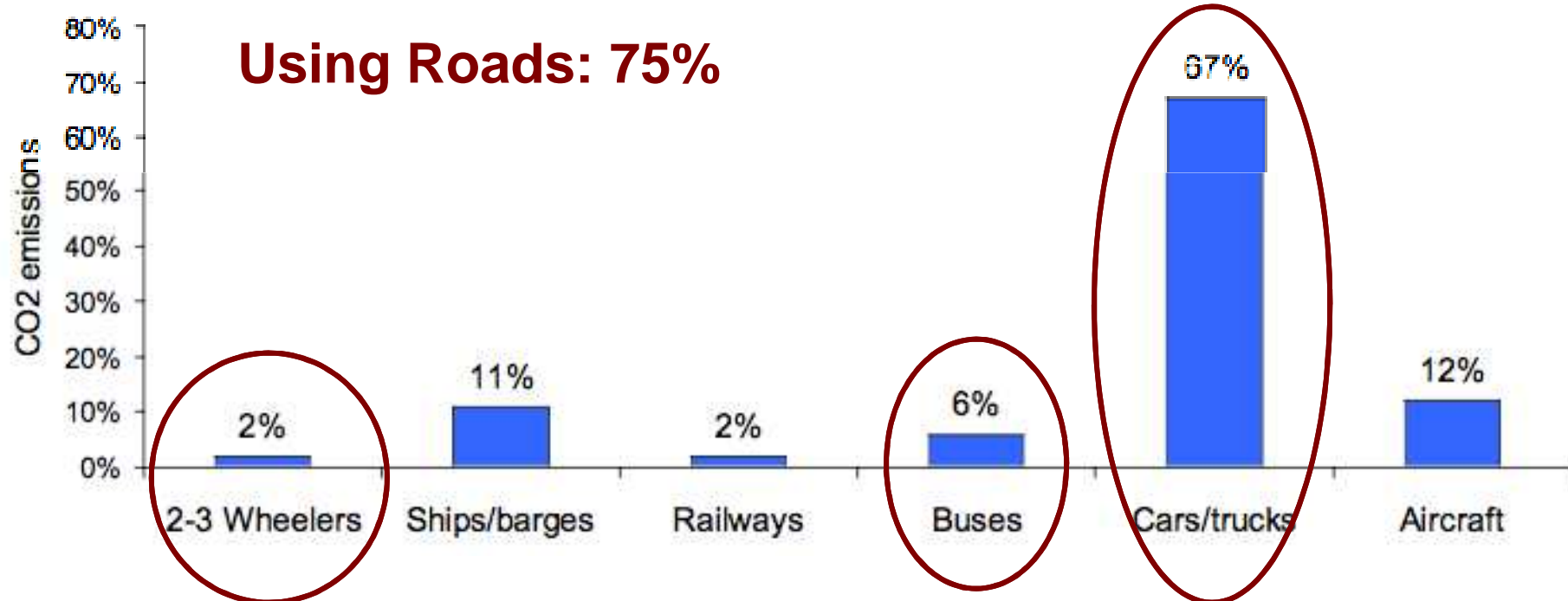
Impacts much beyond the construction phase !

(30 year)

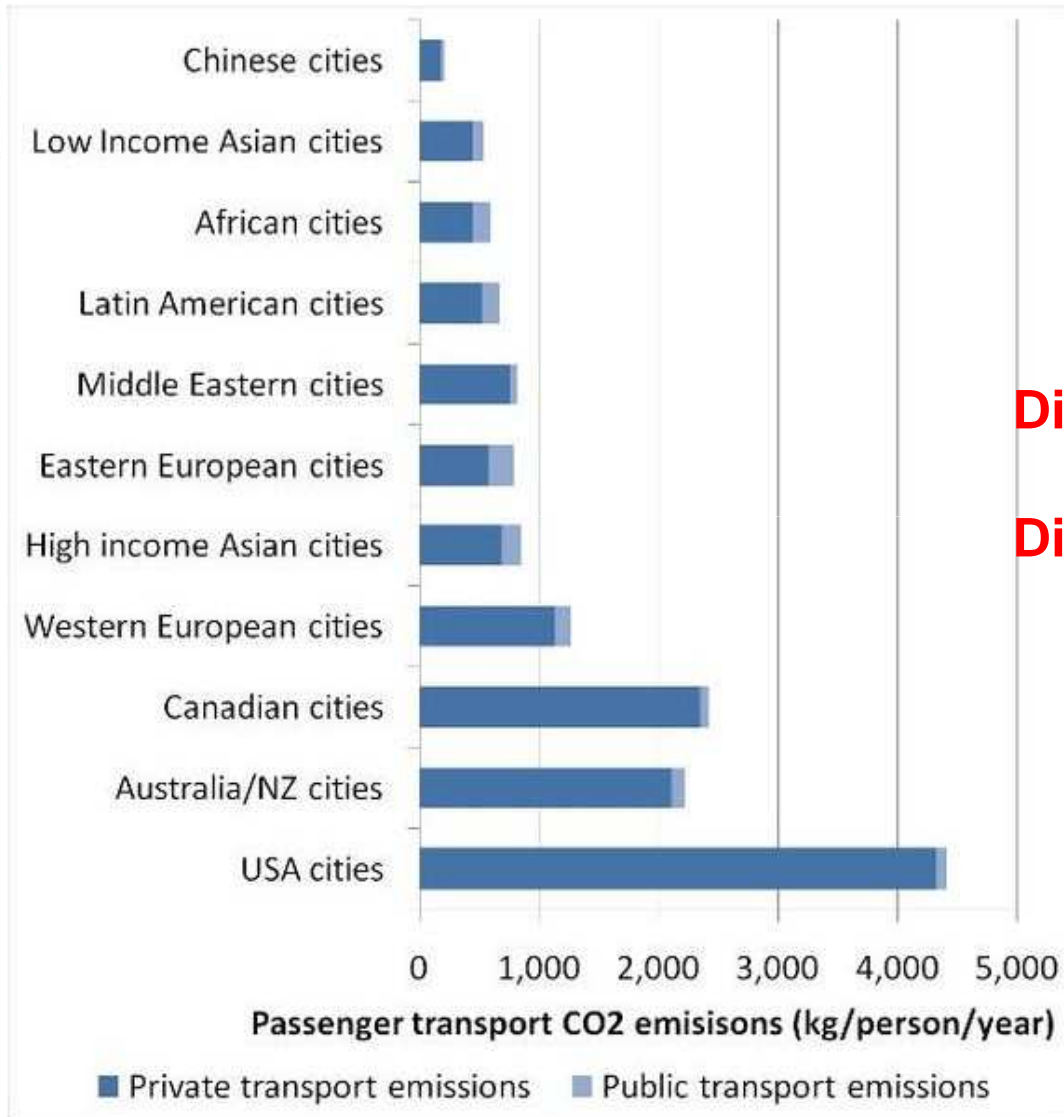


(Source: Alan Pears, 2004 – Sustainability and Roads)

World transport CO2 emissions by vehicle type



World Bank, 2008 – Safe, Clean and Affordable Transport for Development



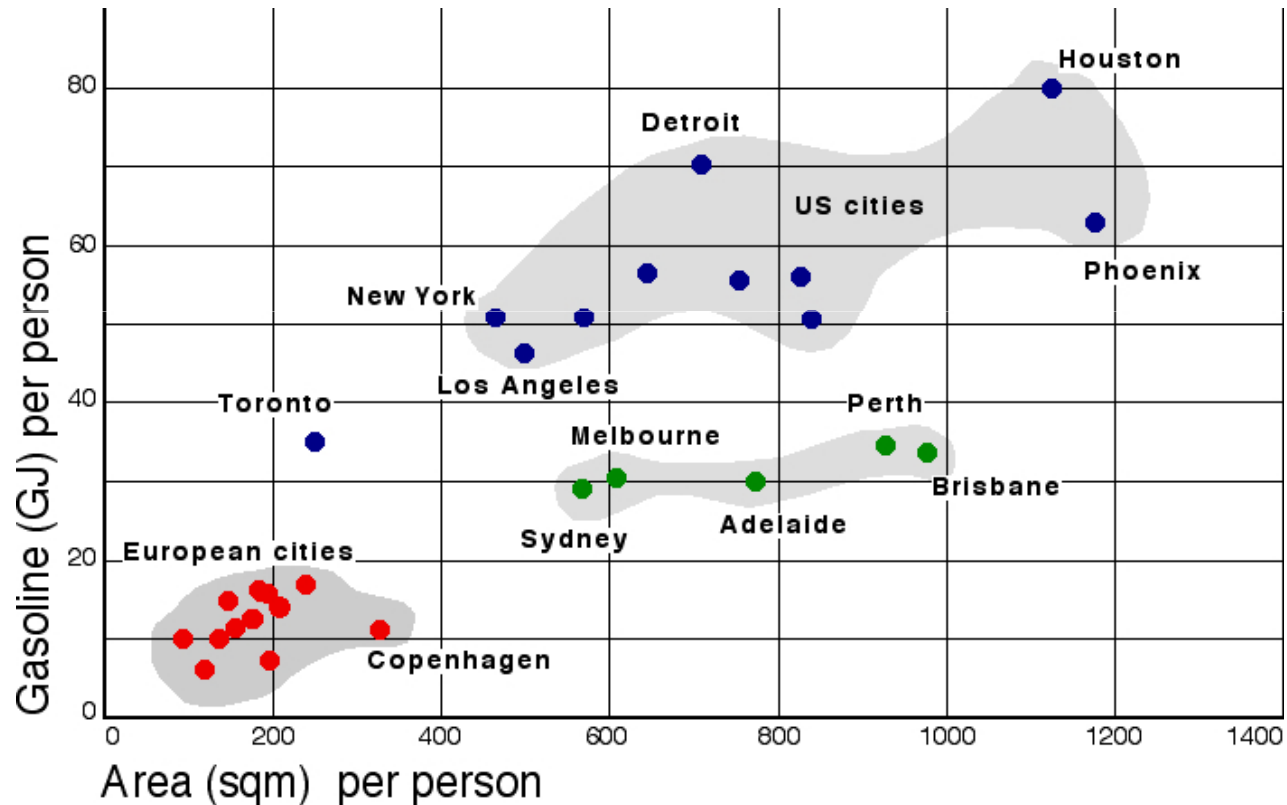
CO2 Emissions

**Different Contributions,
Different Responsibilities!**

(Source: Kenworthy, JR (2002) Transport Energy Use and Greenhouse Gases in Urban Passenger Transport Systems: A Study of 84 Global Cities)

Energy Consumption vs. Urban Density

Land use matters... a lot !



(Source: P Newman, JR Kenworthy; Gasoline consumption and cities: a comparison of US cities with a global survey, Journal of the American Planning Association, 1989)



Calculator for Harmonised Assessment and Normalisation of Greenhouse-gas Emissions for Roads

Emissions sources

CHANGER enables calculation of emissions by reference to the different phases of a construction project, its database covers a comprehensive range of construction processes and materials, including impacts from:

Pre-Construction

Clearing, piling, cut transport, fill transport

On-Site

use of electricity and fuel

Materials

Construction materials, transport of materials

Machinery

Excavators, pavers, rollers, etc.

Flexibility

The flexibility of the system corresponds to a wide variety of user needs - from pre-project phase estimations, right through to comprehensive end-project assessments. In each case, CHANGER automatically generates full or partial reports that can be exported to Excel, Word, PDF and HTML format.

Emissions results are expressed in metric tonnes of CO₂ equivalent.

Further specifications are available on the dedicated website at

www.irfghg.org



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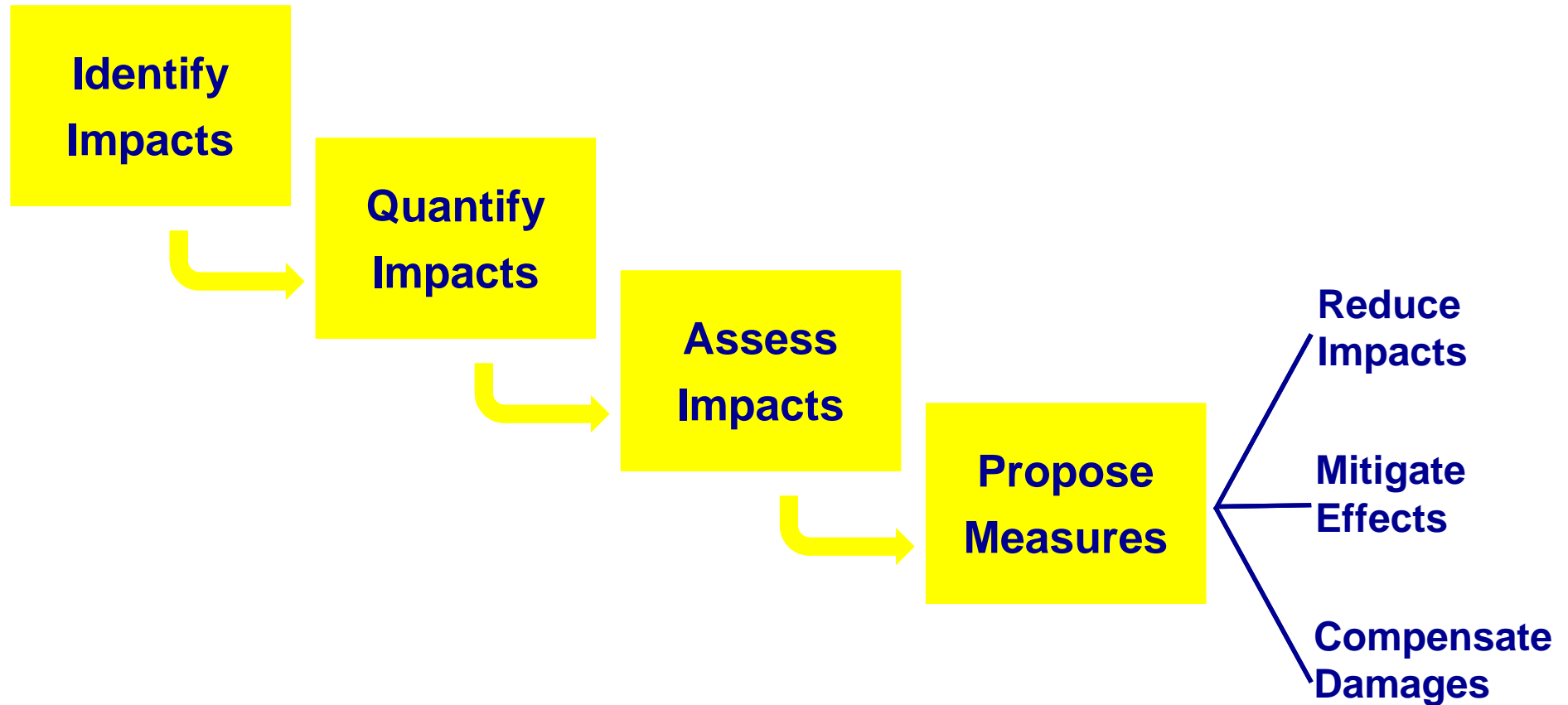
4 Tools

Environmental Impact Assessment
is **THE** tool for preventing unwanted impacts

It is not a tool for **REJECTING** projects,
but rather a tool for **IMPROVING** projects

This is essential for moving towards sustainability !

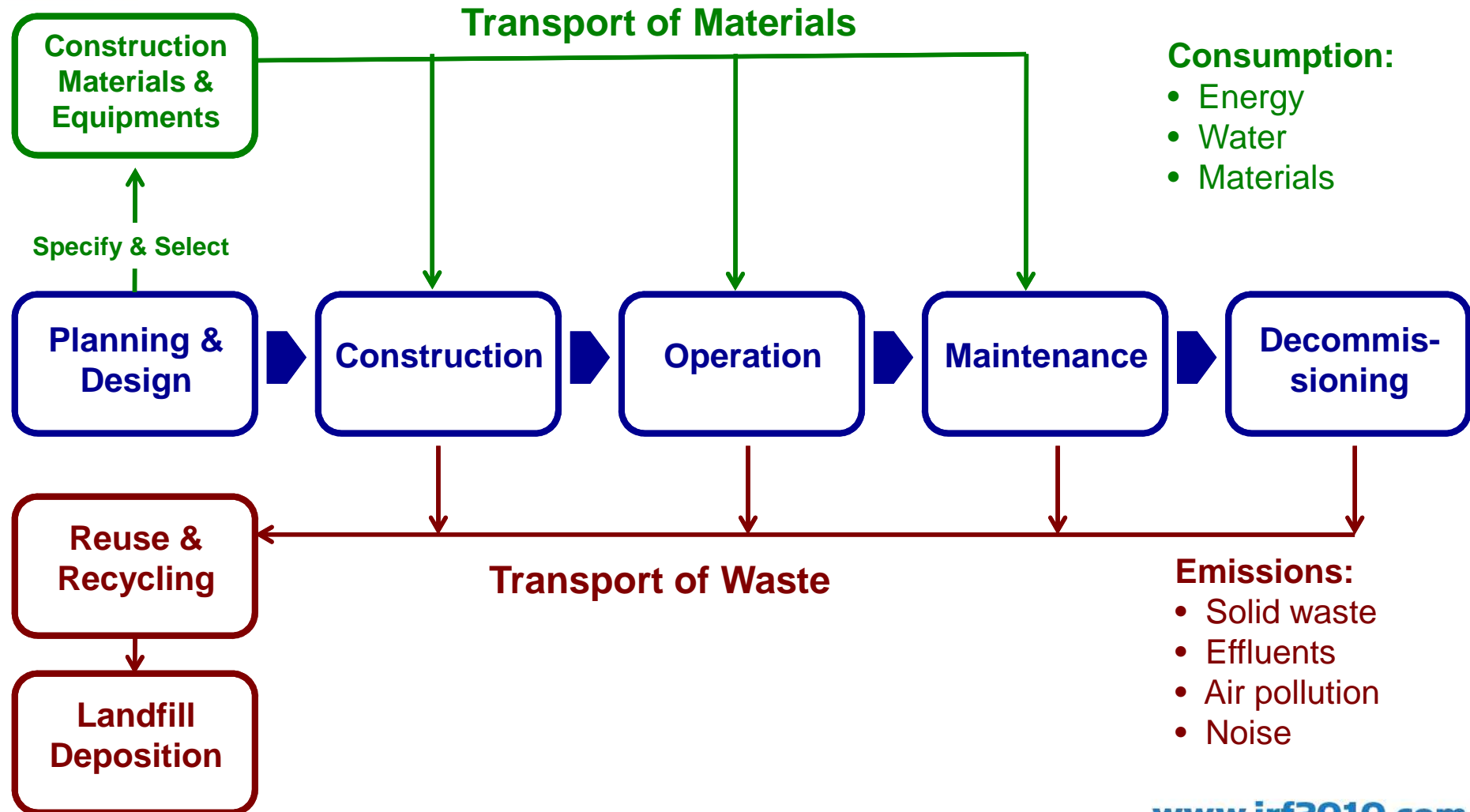
Impact Assessment and Measures



Main Environmental factors

- **Climate**
- **Geology and geomorphology**
- **Soils and land use**
- **Water resources**
- **Air quality**
- **Waste**
- **Noise**
- **Habitats and ecosystems**
- **Heritage**
- **Landscape**
- **Social and economic dimensions**
- **Protection regimes**
- **Risk analysis**

Material Flow Analysis in all phases



An anticipatory approach at a very early stage of the project:

- **Prevents many negative impacts;**
- **Provide more project options;**
- **Is better for the economy of the project.**

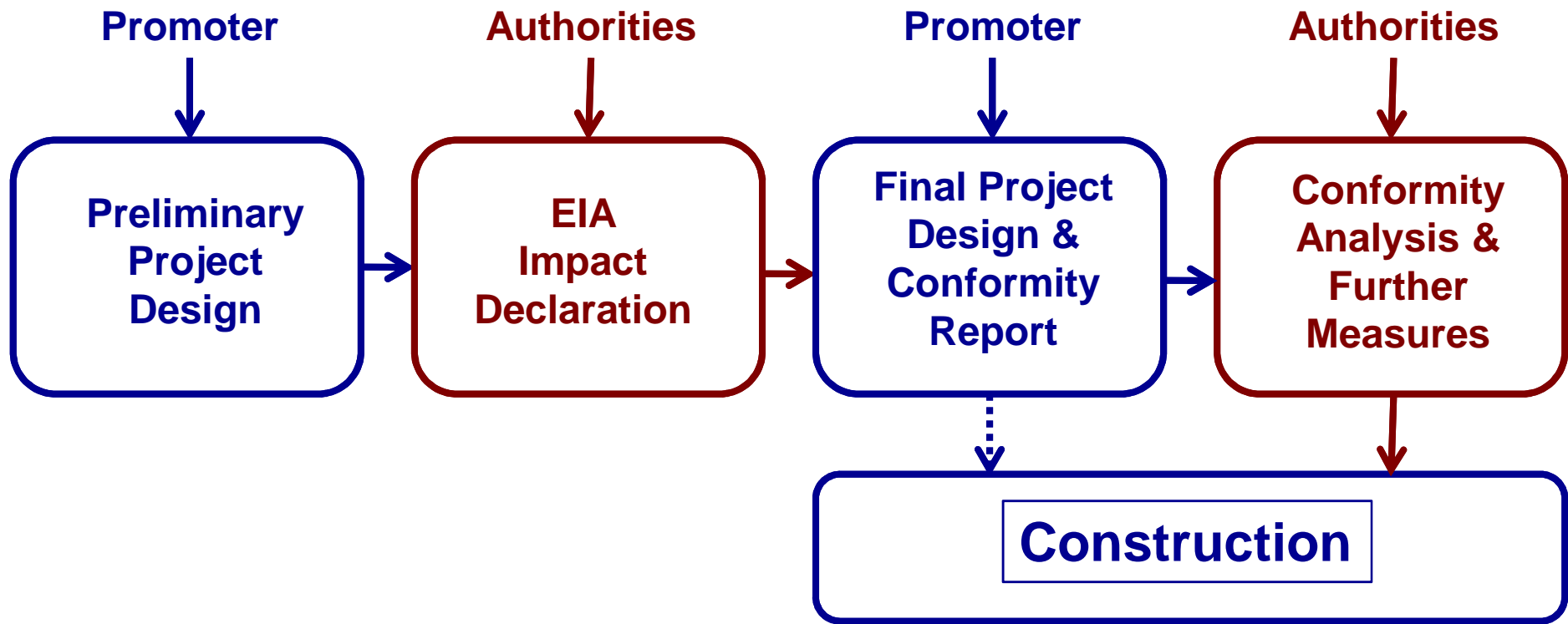
The Environmental Impact Assessment (EIA) can **(should)** be done at a very early stage:

Portuguese procedure: two-phase assessment

- Promoter prepares the EIA at a preliminary design stage;
- Authorities establish an “Impact Declaration” with impact requisites for the final project design;
- Promoter prepares final project design and “Conformity Report” with the established requisites;
- Authorities evaluate the “Conformity Report” and may require further measures or studies, including during the construction phase.

Portuguese procedure: two-phase assessment

Two-Stage Environmental Impact Assessment



Strategic Environmental Assessment (SEA)

is as early as you can go:

- **Relative to Plans or Programs, instead of project design;**
- **It is not a substitute of EIA but it facilitates it at a later stage;**
- **Required by EU Directives in most situations.**



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5 Final comments



Final Comment 1

Sustainability: Construction + Operation

Infrastructure vs. Transport Policy

Do not attempt to make policy
by building infrastructure (fait accompli) !

Do not “write” the plans in concrete
(or in asphalt) !



Final Comment 2

**Infrastructure is instrumental to transport policy
and not transport policy “after” infrastructure !**

But...

**... a lot of optimization can be achieved
for the already built infrastructure !**



Final Comment 3

**Sustainability is global and holistic...
Life cycle analysis of the infrastructure
and measures taken **at all stages**
are essential !**



Final Comment 4

The bar has to be put higher

More ambition,

more demanding targets,

better performance !



World Bank 2008

“Safe, Clean and Affordable Transport for Development”

- **Safe Transport**
- **Clean Transport**
 - **Promote Mass Transit Transport projects (BRT and LRT)**
 - **More investments in Non-Motorized Transport**
 - **Usage of Climate Change Funds in Transport (clean buses for example)**
- **Affordable Transport**



Some steps forward:

Infrastructure

Intelligent roads

Optimize the flow of traffic

Avoid congestion

Concentrate on black spots

Vehicles

Electric cars

Other non-fossil fuels

Improve efficiency

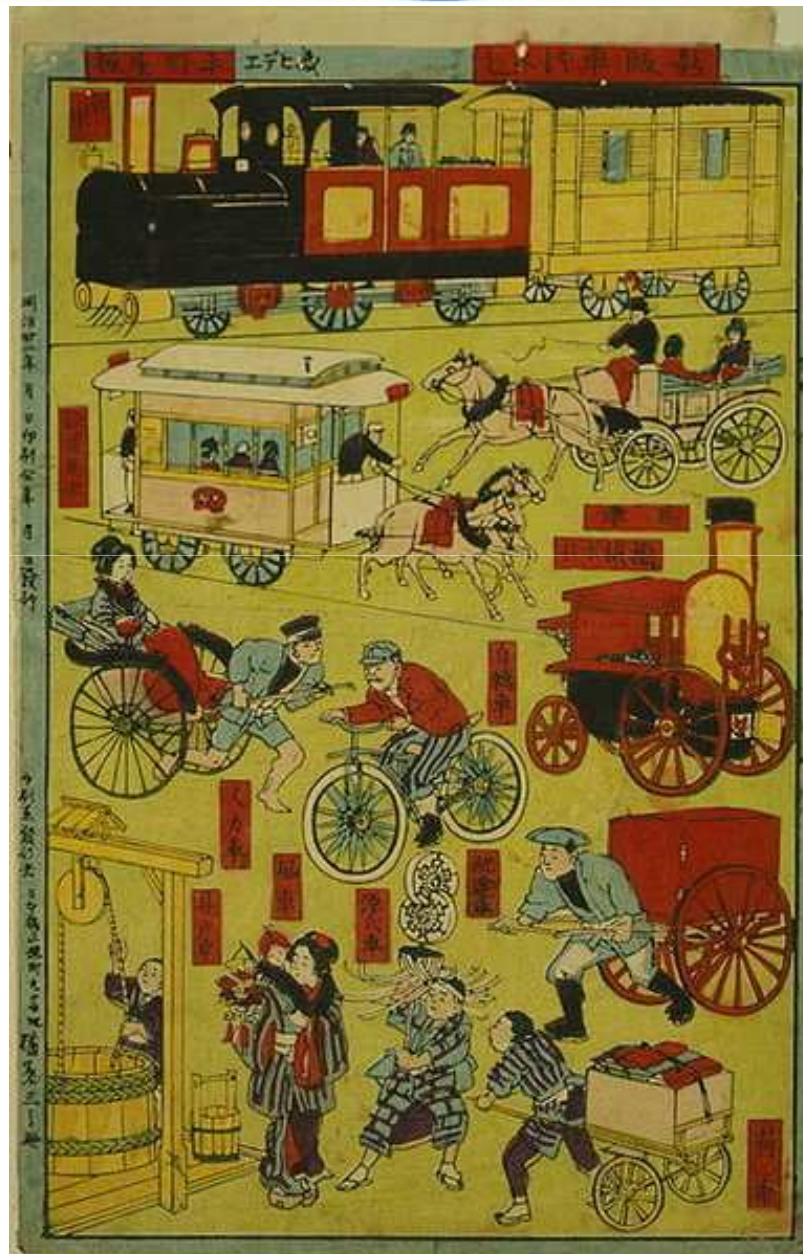
Transport policies

Better public transportation

Better intermodal connections



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Sustainable Transport:

**Make your
Choice**

Thank You !